AMENDMENTS TO THE CLAIMS

This listing of claims will replace all previous versions, and listings, of claims in the Application.

Listing of Claims

Please amend the Claims as follows:

1. (Currently Amended) A method for controlling additions of powder materials into an electrolytic cell designed for the production of aluminium by fused bath electrolysis and provided with ~~at least one powder material distributor and~~ at least one boring device comprising an actuator and a crustbreaker, the actuator comprising a piston connected to a piston rod, the piston rod being connected to the crustbreaker, said cell containing a liquid electrolyte bath and being operated such that an alumina and solidified bath crust is formed above the liquid electrolyte bath, the method comprising: ~~wherein at least one opening is formed in said crust using the boring device and powder material is added through at least one opening using a determined procedure for introducing additions in the bath, and further wherein:~~

~~providing the boring device with at least one position detector capable of detecting at least one determined low position,~~

~~at a determined time,~~ generating an electrical signal to provoke lowering of the crustbreaker using the actuator,

measuring the moment at which the crustbreaker reaches a predetermined low position, using at least one position detector capable of detecting a position of a component of the actuator selected from the group consisting of the piston and the piston rod,

determining the value of at least one powder material feed operation indicator, based on the measured moment, using a function,

using at least one operation criterion and the value of the operation indicator to determine whether an operation is abnormal,

if the operation is not considered to be abnormal, maintaining ~~said~~ a determined procedure for feeding a powder material into the bath through an opening created by the crustbreaker, and

if operation is considered to be abnormal, triggering at least one correction procedure that can correct the abnormal operation ~~that can restore operation of the powder material feed~~.

2. (Currently Amended) A control method according to claim 1, wherein ~~an~~ the operation indicator is given by a descent duration D that is equal to a function of the difference between a time t_0 and a time t.

3. (Previously Presented) A control method according to claim 2, wherein operation is considered to be abnormal if the descent duration D is higher than a determined high threshold Sh, in at least Nh successive determinations.

4. (Previously Presented) A control method according to claim 3, wherein Nh is an integer number from 1 to 10 inclusively.

5. (Previously Presented) A control method according to claim 2, wherein operation is considered to be abnormal if the descent duration is longer than a determined threshold Sh' determined in at least Nh' determinations out of N, such that the ratio Nh'/N is more than a given value Rh.

6. (Previously Presented) A control method according to claim 5, wherein the threshold Sh' are equal to a fixed value or a value calculated using several values for the duration D, that are successive or separated by intermediate values.

7. (Previously Presented) A control method according to claim 2, wherein operation is considered to be abnormal if the descent duration is less than a determined low threshold Sb in at least Nb successive determinations.

8. (Previously Presented) A control method according to claim 7, wherein Nb is an integer number from 1 to 10 inclusively.

9. (Previously Presented) A control method according to claim 2, wherein operation is considered to be abnormal if time t cannot be measured after a time T exceeding a maximum determined threshold Tmax.

10. (Previously Presented) A control method according to claim 9, wherein the threshold Tmax is from 5 to 15 seconds.

11. (Currently Amended) A control method according to claim 1, wherein ~~an~~ the operation indicator[[,]] is determined from a deviation E between at least two values of the duration D, either successive or separated by intermediate values.

12. (Currently Amended) A control method according to claim 11, wherein said deviation E is given by an algebraic difference between two successive values of the duration D or two values separated by intermediate values.

13. (Previously Presented) A control method according to claim 11, wherein said deviation E is given by a mean deviation or a statistical deviation between at least three successive values of the duration D, or three values separated by intermediate values.

14. (Previously Presented) A control method according to claim 11, wherein operation is considered to be abnormal when said deviation E is greater than a determined threshold Se.

15. (Previously Presented) A control method according to claim 1, wherein said correction procedure comprises at least one automatic or manual action to correct operation of the boring device.

16. (Currently Amended) A control method according to claim 1, wherein the cell comprises at least two boring devices each associated with a distinct powder material distributor for feeding powder material into the bath, and further wherein the correction procedure includes an at least temporary interruption of the feed by the distributor associated with the boring device for which operation is considered to be abnormal.

17. (Currently Amended) A control method according to claim 16, wherein said ~~method~~ correction procedure comprises distributing the feed of powder material on another distributor in the cell.

18. (Previously Presented) A control method according to claim 1, wherein when operation of at least one boring device is considered to be abnormal, the control method also comprises a modification of the determined procedure.

19. (Currently Amended) A control method according to claim 1, wherein the predetermined low position is a position at which the crustbreaker comes into contact with the liquid electrolyte bath.

20. (Currently Amended) A control method according to claim 1, wherein the predetermined low position is a lowest position allowed by the actuator.

21. (Currently Amended) A control method according to claim 1, wherein the at least one boring device ~~or each boring device~~ comprises at least one jack fitted with said position detector.

22. (Previously Presented) A control method according to claim 21, wherein said detector is a stroke end detector.

23. (Currently Amended) A control method according to claim 1, wherein the position detector is at least one selected from the group consisting of mechanical detectors, electrical detectors, optical detectors, ~~of~~ magnetic detectors, and detectors comprising any combination thereof.

24. (Currently Amended) A control method according to claim 1, wherein the electrical signal transmits ~~the crustbreaker lowering~~ an order to lower the crustbreaker, the order being transmitted in at least one way selected from the group consisting of: electrically, optically, and pneumatically.

25. (Currently Amended) A control method according to claim 1, wherein said powder materials are selected from the group consisting of: alumina based powders, aluminium fluoride powders and cryolite based powders, and combinations thereof.

26. (Currently Amended) A control system for controlling additions of powder materials into an electrolytic cell designed for the production of aluminium by fused bath electrolysis and provided with at least one powder material distributor and at least one boring device comprising an actuator and a crustbreaker, the actuator comprising a piston connected to a piston rod, the piston rod being connected to the crustbreaker, said cell containing a liquid

electrolyte bath and being operated so as to form an alumina and solidified bath crust above a liquid electrolyte bath, wherein said system comprises:

a means ~~of~~ for generating an electrical signal capable of causing the crustbreaker to be lowered by ~~means of~~ the actuator at a determined time t_0,

a device for measuring the moment t at which the crustbreaker reaches a predetermined low position, said device comprising at least one position detector capable of detecting a position of a component of the actuator selected from the group consisting of the piston and the piston rod ~~said determined low position~~, and

a diagnostic means ~~of~~ for determining the value of at least one feed operation indicator starting from a value of time t_0 and a value obtained for time t.

27. (Currently Amended) A control system according to claim 26, wherein said detector is integrated into the at least one boring device.

28. (Previously Presented) A control system according to claim 27, wherein said detector is integrated into said actuator in each boring device.

29. (Previously Presented) A control system according to claim 28, wherein the actuator comprises a jack fitted with said detector.

30. (Previously Presented) A control system according to claim 26, wherein said detector is a stroke end detector.

31. (Previously Presented) A control system according to claim 26, wherein the detector is at least one selected from the group consisting of mechanical detector, electrical detector, optical detector, magnetic detectors, and detectors comprising any combination thereof.

32. (Previously Presented) A control system according to claim 26, wherein the control system comprises a regulator.

33. (Currently Amended) A control system according to claim 32, wherein the regulator comprises ~~specific~~ means ~~of~~ for implementing automatic actions intended to correct operation of said boring device when ~~an~~ the operation indicator reveals abnormal operation of the feed.

34. (Currently Amended) A control system according to claim 26, wherein said powder materials are selected from the group consisting of: alumina based powders, aluminium fluoride powders and cryolite based powders, and combinations thereof.

35. (Previously Presented) A control method according to claim 3, wherein the threshold Sh are equal to a fixed value or a value calculated using several values for the duration D, that are successive or separated by intermediate values.

36. (New) A method for operating an electrolytic cell containing a liquid electrolyte bath having a solidified crust formed thereon, the cell having a boring device and a powder material distributor associated therewith, the boring device comprising an actuator having a crustbreaker connected thereto such that the actuator is configured to move the crustbreaker, the method comprising:

generating an electrical signal configured to cause the actuator to lower the crustbreaker toward the electrolyte bath;

measuring a descent duration for the crustbreaker to reach a predetermined low position;

determining, based on the descent duration, whether an operation of the electrolytic cell is abnormal;

if the operation is not determined to be abnormal, maintaining a normal procedure for feeding a powder material into the bath by the powder material distributor through an opening created by the crustbreaker; and

if the operation is determined to be abnormal, triggering at least one correction procedure for correcting the abnormal operation.

37. (New) A method according to claim 36, wherein the operation is an operation of at least one of the boring device and the powder material distributor.

38. (New) A method according to claim 36, wherein the operation is determined to be abnormal if the descent duration is higher than a determined high threshold Sh, in at least Nh successive determinations.

39. (New) A method according to claim 36, wherein the operation is determined to be abnormal if the descent duration is less than a determined low threshold Sb in at least Nb successive determinations.

40. (New) A method according to claim 36, wherein the operation is determined to be abnormal if the descent duration cannot be measured after passage of a threshold time period.

41. (New) A method according to claim 36, wherein the crustbreaker reaching the predetermined low position is detected by a position detector associated with the boring device and capable of detecting a position of a component of the actuator.

42. (New) A method according to claim 41, wherein the actuator comprises a piston connected to a piston rod, the piston rod being connected to the crustbreaker, wherein the component of the actuator detected by the position detector is selected from the group consisting of the piston and the piston rod.

43. (New) A method according to claim 36, wherein the cell comprises at least two boring devices, each associated with a distinct powder material distributor for feeding powder material into the bath, and further wherein the correction procedure includes an at least temporary interruption of the feed by the powder material distributor associated with the abnormal operation.